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|-------------------------------|------------------------|---------------------|--|
| <b>Notice of Allowability</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                               | 10/653,250             | BENCHAIB ET AL.     |  |
|                               | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                               | Stephen J. Cherry      | 2863                |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12-12-03.
2. ☒ The allowed claim(s) is/are 1-21.
3. ☒ The drawings filed on 03 September 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date <u>9-3-2003</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                               | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|  | 9. <input type="checkbox"/> Other _____.   |

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Neils on 9-23-2004.

The application has been amended as follows:

Delete claim 2 and replace with:

2. A method according to claim 1, further comprising the following steps:
- d) iterating the step a)  $\underline{n}$  times with, on each iteration, a new sequence of voltage vectors including a voltage vector offset angularly relative to the voltage vectors of the preceding sequences, wherein  $\underline{n}$  is a positive integer,
  - e) on each iteration of the step d), determining, at least for the angularly offset vector, a response signal from each winding to application of said voltage vector, said response signal being correlated to the angular position of the rotor, and
  - f) using the results of the step e) to reduce the uncertainty as to the position established during the step c).

Delete claim 17 and replace with:

17. A computer according to claim 16, further adapted to:

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- d) iterate the step a)  $n$  times with, on each iteration, a new sequence of voltage vectors including a voltage vector offset angularly relative to the voltage vectors of the preceding sequences, wherein  $n$  is a positive integer,
- e) on each iteration of the step determine, at least for the angularly offset vector, a response signal from each winding to application of said voltage vector, said response signal being correlated to the angular position of the rotor, and
- f) use the results of the step e) to reduce the uncertainty as to the position established during the step c).

***Allowable Subject Matter***

Claims 1-21 are allowed.

The following is an examiner's statement of reasons for allowance:

The independent claim 1 recites, "a) applying a first sequence of successive voltage vectors to the terminals of the windings, each voltage vector defining the value of the non-zero voltage to be applied simultaneously to the supply terminals of each winding, said first sequence including first and second voltage vectors adapted to modify the electrical characteristics of the windings when the driving magnetic field created by the windings is added to the magnetic field of the rotor and a third voltage vector adapted to cancel out the torque created by applying the first and second voltage vectors,". This feature in combination with the remaining claimed structure avoids the prior art of record.

The independent claim 16 recites, "a) command the application of a first sequence of successive voltage vectors to the terminals of the windings, each voltage vector defining the value of the non-zero voltage to be applied simultaneously to the supply terminals of each winding, said first sequence including first and second voltage vectors adapted to modify the electrical characteristics of the windings when the driving magnetic field created by the windings is added to the magnetic field of the rotor and a third voltage vector adapted to cancel out the torque created by applying the first and second voltage vectors,". This feature in combination with the remaining claimed structure avoids the prior art of record.

U.S. Patent 6,246,193 to Dister presents a method of determining stopped rotor position that requires that excitation voltages be kept low to avoid rotor rotation ('193, col. 9, line 45). Dister does not disclose canceling rotor torque with an additional voltage vector.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

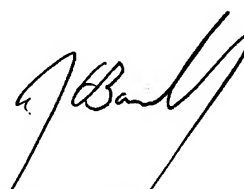
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Cherry whose telephone number is (571) 272-2272. The examiner can normally be reached on M-F 8:00-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SJC



John Barlow  
Supervisory Patent Examiner  
Technology Center 2800